# Performance Evaluation of Pakistani Mutual Funds: Through CAPM model

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**Abstract**

*The study was conducted to evaluate the performance of Pakistan mutual funds. Mutual fund is an enterprise that puts resources into a differentiated arrangement of securities. Individuals who pay for shares of a mutual fund are its proprietors or shareholders. Out of the total 119 mutual funds, 89 mutual funds were selected for the sample of the study. The data were collected from financial statement of the Mutual Funds, Mutual Funds Association of Pakistan and State Bank of Pakistan from 1962 to 2015. In this study Capital Assets Pricing Model (CAPM) was used to evaluate the performance of Mutual funds. The Capital Assets Pricing Model (CAPM) shows that money market, equity, sharia, display insignificant effects while the income market, asset allocation, balanced and closed ended shows significant effects.*
Keywords: Performance Evaluation, Mutual Funds, Capital Assets Pricing

A mutual fund is a collective investment scheme, which specializes in investing a pool of money collected from investors for the purpose of investing in securities such as stocks, bonds, money market instruments and similar assets. There are two types of mutual fund (1) open ended and (2) closed ended, open ended mutual funds which continually create new units or redeem issued units on demand. They are also called Unit Trusts. The Unit holders buy the Units of the fund or may redeem them on a continuous basis at the prevailing Net Asset Value (NAV). These units can be purchased and redeemed through Management Company which announces offer and redemption prices daily and closed ended mutual fund have a fixed number of shares like a public company and are floated through an IPO. Once issued, they can be bought and sold at the market rate s in secondary market (Stock Exchange). The market rate is announced daily by the stock exchange.

In the origins of the Capital Assets Pricing Model (CAPM), two studies conducted by Markowitz, (1952) which presented the first precise justification for selection and diversification of portfolios in "Portfolio Selection" study. Later on Markowitz (1959) reported mean variance analysis of Portfolio. In which researcher established portfolio theory as one of the main theory of financial economics. His work presented a direct and clear root to the capital assets pricing model. He became inclined towards simplifying portfolio selection issues after publishing his first paper about CAPM. It is hard to find mean variance of efficient portfolio, to solve this problem (Markowitz, 1959) proposed "single index model" also in literature known as one factor model. Both Markowitz and Sharpe puts "single index model" in their study where, reported as a capital asset pricing model (CAPM). Certainly, William Sharpe involved this idea with Markowitz and put Sharpe on the line of research that concluded his report of Capital Assets Pricing Model. Modigliani & Miller (1958) directed review on cost of capital, partnership back and speculation hypothesis, and contended the relationship between an association's capital structure and its cost of capital (markdown rate). Treynor built up the main hypothetical examination to deciding the right markdown rate. Hence, the study purports to investigate performance evaluation of Pakistani mutual funds through capital assets pricing model for mutual funds, mutual funds association of Pakistan and state bank of Pakistan from 1962 to 2015. The study is set to achieve the following objective: Evaluate the performance of mutual funds in Pakistan through CAPM model. The research question to be answered is how mutual fund performance is evaluated through CAPM model.

## Literature Review

The Capital Assets Pricing Model (CAPM) is broadly utilized as a part of back that set up to clarify connection amongst hazard and the required rate of return. This model represents a relationship between the hazard free rate (RFR), an advantage's beta and value chance premium. In this writing survey certain papers will be talked about clarifying stock comes back from 1952, when Markowitz proposed Modern Portfolio Theory. The pioneer of the CAPM model was Jack Treynor. At first, in 1961, the hypothesis

couldn't be completely tried as no specimens of such greatness and quality were accessible. The testing of the CAPM began in 1970. In 1973, business analysts were presented with the Black and Scholes alternatives estimating model. The primary review which negated the consequences of the CAPM was the examination by (Basu 1977). In spite of the fact that in simultaneousness with the Efficient Market Hypothesis, Basu finished up something other than what's expected than the CAPM. In his review he found that stocks with high profit/value proportion earned impressively higher returns contrasted with stocks with low income/value proportion. Later on, in 1983, Basu additionally extended his before research and arrived at the conclusion that these income/value proportions were evident in little tops. This review smashed the CAPM, in light of the fact that in the CAPM demonstrate the beta clarified everything. Other than the profit/value proportion, the CAPM needed to survive more evaluate.

Banz (1981) and Basu (1983) later on likewise found that contrasted with the organizations having vast market capitalization, firms with low market capitalization indicated higher normal returns. Higher returns by little firms were yet another blow for the CAPM display. Supporters of the CAPM display brought up that the beta of little firms was normally higher than the beta of vast firms. In any case, this distinction in beta was not sufficiently noteworthy to clarify the diverse returns amongst little and huge tops. Rosenberg et al. (1985) called attention to another issue with the CAPM. They demonstrated that stocks with high proportions of normal value's book an incentive to regular value's fairly estimated worth, otherwise called book to market value, had higher returns than stocks with a low book to market value. Bhandari (1988) demonstrated that contrasted with firms with low use, firms with high use had higher normal returns. A firm with a higher obligation ought to have a higher beta, however he demonstrated that even after change of beta, firms still could have a higher return.

Bauer, Shapiro and Tepla (2006) tried the execution consistency of mutual funds (Dead + Surviving) in New Zealand. Survivorship predisposition controlled Sample of 143 open-ended mutual funds was considered from January 1990 - September 2003. Execution attribution demonstrates, Single component model (CAPM) and quadratic planning model which was an expansion of CAPM were used in the instant research. The variables put in use in the research were expense ratios, fund timing, fund size, management fees and excess returns. The results, in totality, showed that New Zealand's mutual funds were unable to overtake. The equity funds showed Alpha as almost zero, while the balanced funds showed some significance. A positive relationship of the risk balanced execution with expense ratio and fund size of equity mutual funds was also observed.

Mahmud and Mirza (2011), during the period of 2006 – 2010, pointed out the performance of mutual funds in Pakistan. For appraising the performance initially Sharpe measure was used to calculate Excess return, afterwards performance was appraised by comparison with the market return used as Benchmark. Jensen's Alpha, Sharpe ratio, Fama French three factors model and CAPM model were used as tools for research. Results of the research showed that Islamic funds exhibited encouraging performance and growth compared to the conventional funds and the income funds depicted negative excess returns because of immaturity of bonds market and extraordinary rates on T-bill.

Rehman and Baloch (2016) studied mutual fund is a choice of investment for the small investors to investing capital market through skillful professional management. The research paper attempts to validate the Capital Asset Pricing Model and Fama French 3-Factors Model and their preferred suitability in measuring and evaluating the mutual fund performance in Pakistan. The month wise data of one hundred open ended Pakistani mutual funds for the period from 2009 to 2015 is analyzed by both models. The Capital Asset Pricing Model showed significance results for all the portfolios; however, the intercepts of this model were found increasing in size, showing poor performance for the high performance portfolios. The Fama French 3-factors model demonstrated poor results for two factors i.e. fund size and fund value, however the market factor showed significant coefficients for all the portfolios. The Gibbon Ross Shanken test was applied to find the best model between the two competing models. This test results revealed that Capital Asset Pricing Model is the preferred model between the two competing models.

## Methodology

Ojo (2003) characterized the term methodology as an arrangement of express standards and techniques in which research is based and against which cases of information are assessed. Along these lines, this area concentrates on the exploration methods received and utilized for this review with the point of

accomplishing the examination destinations. In the proposed study closed ended and open ended mutual funds enrolled in Mutual Funds Association of Pakistan (MUFAP) was considered as populace of the review and that is 119 mutual funds. Out of the total 119 mutual funds, 93 mutual funds were selected for the sample of the study on the basis of the availability of the data. Data was collected from these mutual funds from 1962 to 2015. For analysis the data was gathered from their yearly reports and also from Balance sheet investigation of State Bank of Pakistan. The information of the Net Assets Values (NAVs) was the major component of the data analysis. The historical data of NAVs were collected from the official web site of Mutual Funds Association of Pakistan (MUAF). The study used regression analysis to find the effects of the variables on one another, coefficient of variance, t-test was run to find the significance.

In present day, the CAPM has a place with the most generally utilized models that attempt to quantify the required rate of return of an advantage. Treynor (1961), Sharpe (1964), Lintner (1965) & Mossin (1966) independently based on the MPT, brought about the Capital Asset Pricing Model. As per the CAPM, investors will just put resources into a benefit on the off chance that they get adjusted for the time estimation of cash and for the risk they take. Beginning with the time estimation of cash, the CAPM utilizes a sans risk rate. This without risk rate repays the portfolio holder for the arrival he or she would have regularly picked up on the off chance that he or she had put a similar measure of cash in a venture that is completely risk free, such as acquiring cash to the legislature. In the CAPM this is reflected by Rf. Alongside the risk free rate, portfolio holders likewise encounter different sorts of risk. In the CAPM, we can see two sorts of risk: efficient risk and non-methodical risk. Deliberate risk can't be kept away from and the holder of the portfolio ought to be adjusted for this. Precise risk is frequently full scale monetary and has their impact on all stocks. Then again, investors ought not be allowed a higher return for bearing non-deliberate risk, additionally called the particular risk, since this sort of risk can be mineralized and as a rule even wiped out by broadening. Particular risk is normally related with components that influence a solitary resource. Still, one of the risks stays, precise risk, and the CAPM utilizes a beta to repay investors for the risk they take. A high beta implies that the advantage is significantly influenced by full scale financial changes, so the difference will be high. A low beta implies that the benefit is not be strongly influenced by market changes, so the normal return can likewise be lower.

$$E (R_a) = R_f + \beta_a * E (R_m - R_f)$$

Where:

E (Ra) = Expected profit for resource

Rf = without risk rate

βa = Beta of advantage

ERm = Expected profit for market

**Analysis and Discussion**

The current study was conducted to evaluate the performance of Pakistani mutual funds. This study was divided them into portfolios in-order to get most accurate results both individually and sector wise. The current study makes the portfolios on the basis of their nature and sector; the same sector firms are associated into a single portfolio.

Table 1: *Portfolio*

| S.No | Portfolio | Name | No of funds |
|------|-----------|------|-------------|
| 1 | Portfolio 1 | Money Market | 15 |
| 2 | Portfolio 2 | Income | 19 |
| 3 | Portfolio 3 | Equity | 14 |
| 4 | Portfolio 4 | Index tracker | 1 |
| 5 | Portfolio 5 | Assets allocation | 6 |
| 6 | Portfolio 6 | Balanced | 7 |
| 7 | Portfolio 7 | Fund of funds | 1 |
| 8 | Portfolio 8 | Aggressive income | 2 |
| 9 | Portfolio 9 | Sharia Complaint | 15 |
| 10 | Portfolio 10 | Closed ended | 13 |
| | | Total | 93 |

It is having no concern with it that how much we diversity our investment. It is not possible to get free from risk. Investors as deserve return rate which from taking risk compensates us. The CAPM helps to know investment risk and what should be expected as investment return. Here, behind the modal we look back to a formula, which is the evidence against and for CAPM accuracy and what to the average investors CAPM means. In Current portfolio, they suggest that specific risk can be eliminated with diversification. The problems that still diversification does not solve in the issues of systematic risk. Therefore, when measuring deserved return, investors are mostly worried about systematic risk. Therefore, CAPM is developed as a systematic risk measure.

Beta is discovered by statistical analysis of daily, individual share price return. Comparison with the market in daily return precisely over the same period, in 1972 classic study titled "the Capital Assets Pricing Model" various " empirical tests" Fischer, Myron & Michael, financial economist shown a linear link b/w Beta and the financial return of portfolios stocks.

Table 2: *Money market*

| | Mutual Funds Values | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 4.357 | 0.1608 | 0.0313 | 0.057 | 0.954 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds. In the above model $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is 0.16 which means that the independent variable shows 16 percent variance in the dependent variable. The value of coefficient shows per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by .03 units in positive direction when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the money market showed less movement to the broader market. The t-value of the model is 0.057 which is less than absolute value of standard 2. So, in this case, there is not enough evidence to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the money market mutual funds.

Table 3: *Income*

| | Mutual Funds Values | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 9.03 | 0.347 | 0.324 | 3.006 | .0000 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds. In the above model, $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is 0.347 which means that the independent variable shows 34 percent variance in the dependent variable. The value of coefficient shows per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by .324 units in positive direction when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the income market showed reasonable movement to the boarder market. The t-value of the model is 3.006 which is more than absolute value of standard 2. So, in this case, evidence is to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the income market mutual funds.

Table 4: *Equity*

| | Mutual Funds Values | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 9.30 | 0.072 | 0.1290 | 0.967 | 0.354 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds. In the above model, $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is

0.072 which means that the independent variable shows 7 percent variance in the dependent variable. The variance explained by independent variable is less which is not supportive for the investors in the equity mutual funds. The value of coefficient show per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by 0.1290 units in positive direction when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the equity market showed reasonable movement to the boarder market. The t-value of the model is 0.967 which is less than absolute value of standard 2. So, in this case, no evidence found to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the equity market mutual funds.

Table 5: *Assets Allocation*

| | **Mutual Funds Values** | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 15.39 | 0.793 | -0.425 | -3.92 | .000 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds.     In the above model, $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is 0.793, which means that the independent variable shows 79 percent variance in the dependent variable. The variance explained by independent variable is more which can be supportive for the investors in the equity mutual funds. The value of coefficient show per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by -.425 units in the opposite direction when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the asset allocation market showed opposite movement to the boarder market. The t-value of the model is -3.92 which more than absolute value of standard 2 is. So in this case evidence is to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the asset allocation market mutual funds.

Table 6: *Balanced*

| | **Mutual Funds Values** | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 16.39 | 0.766 | 0.707 | 4.04 | .000 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds.     In the above model, $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is 0.766, which means that the independent variable shows 76 percent variance in the dependent variable. The variance explained by independent variable is more which can be supportive for the investors in the balanced mutual funds. The value of coefficient show per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by .707 units in the same direction to the market when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the balanced market showed in the same direction of movement to the boarder market. The t-value of the model is 4.04 which are more than absolute value of standard 2. So, in this case, evidence is to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the balanced market mutual funds.

Table 7: *Sharia*

| | **Mutual Funds Values** | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 0.71 | 0.0541 | 0.0761 | 0.2664 | 0.794 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds. In the above model, $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is 0.05

which means that the independent variable shows 5 percent variance in the dependent variable. The variance explained by independent variable is less which can't be supportive for the investors in the Islamic mutual funds. The value of coefficient show per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by .0761 units in the same direction to the market when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the Islamic Funds market showed in the same direction of movement to the boarder market. The t-value of the model is 0.2664 which is less than absolute value of standard 2. So, in this case, no evidence found to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the Islamic Mutual funds market mutual funds.

Table 8: *Closed ended*

| | Mutual Funds Values | | | | |
|---|---|---|---|---|---|
| **Measure** | **Test value** | **R-square** | **Coefficient** | **t-value** | **Sig** |
| Rm-Rf | 35.16 | 0.761 | -2.3702 | -5.934 | 0.000 |

The above table is the output of regression model used to check the implementation of CAPM model in the Pakistani mutual funds.      In the above model, $R_i$-$R_f$ is the dependent variable and $R_m$-$R_f$ is the independent variable. The value of R-square which is also known as the coefficient of determination is 0.761 which means that the independent variable shows 76 percent variance in the dependent variable. The variance explained by independent variable is more which can be supportive for the investors in the closed ended mutual funds. The value of coefficient show per unit change in the $R_i$-$R_f$ due to $R_m$-$R_f$. $R_i$-$R_f$ will be changed by -2.3702 units in the opposite direction to the market when the $R_m$-$R_f$ changes by 1 unit. The value of coefficient shows that the average return of the funds in the closed ended funds market showed in the opposite direction of movement to the boarder market. The t-value of the model is -5.934 which more than absolute value of standard 2 is, so, in this case, evidence is to support alternate hypothesis that $R_m$-$R_f$ has significant effects on $R_i$-$R_f$ in the closed ended market mutual funds.

## Conclusions

The majority of the funds have little return than the profit coordinating with the level of risk, their supervisors have taken. In this manner, the return of the greater part of the fund is not as much as what it ought to have been. Thus, we can conclude that in Pakistan the benchmark portfolio has superior risk adjusted performance than the open-ended mutual funds industry.

A successful manager is one who can beat the market all the time. Dread of misfortune by and large overwhelms the delight of pick up. This dread is much bigger for the individuals who don't have enough skill in the administration of assets. An individual thinks that it's hard to have somebody who may investigate his issues productively. There are sure advantages which add to the fame of funds the world over. They incorporate the capacity to choose at the perfect time and pick the correct security called market timing and selectivity individual (Lee & Rehman, 1990).The individual performances of the portfolios shows that beta of money market funds show that 13 funds are having high risk and the investors will face risky situations in the profit while investing in these funds.

The findings of the CAPM model and the risk measurement model show that the Pakistani mutual funds are having higher risk. The management of the mutual funds should try to make the accurate financial decisions so that the investor might face the higher risk but they should have the higher return as well.

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